

1. Find values for  $m$  and  $n$  such that  $f(x)$  will be a continuous function.

a. 
$$f(x) = \begin{cases} -3x + m & \text{for } x < -1 \\ -2x^2 + 4 & \text{for } -1 \leq x \leq 1 \\ 3x + n & \text{for } x > 1 \end{cases}$$

b. 
$$f(x) = \begin{cases} \frac{1}{2}x + m & \text{for } x < 4 \\ x^2 - 8 & \text{for } 4 \leq x \leq 7 \\ 2x + n & \text{for } x > 7 \end{cases}$$

2. Given the piecewise function  $f(x)$  shown below, evaluate the following expressions.

a.  $f(-6)$

b.  $\lim_{x \rightarrow -6^-} f(x)$

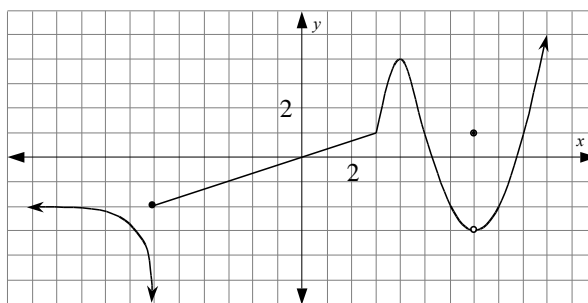
c.  $\lim_{x \rightarrow 3} f(x)$

d.  $f(7)$

e.  $\lim_{x \rightarrow 7} f(x)$

f.  $\lim_{x \rightarrow \infty} f(x)$

g.  $\lim_{x \rightarrow -\infty} f(x)$



3. Given the piecewise function  $f(x)$  shown below, evaluate the following expressions.

a.  $f(-6)$

b.  $\lim_{x \rightarrow -6} f(x)$

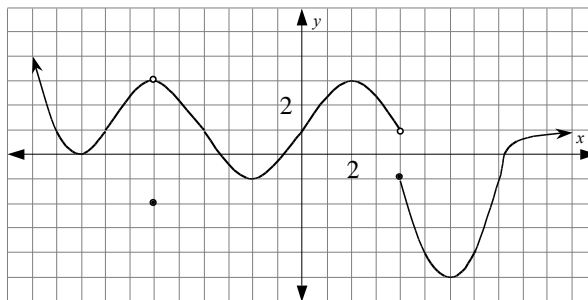
c.  $\lim_{x \rightarrow 4^-} f(x)$

d.  $\lim_{x \rightarrow 4^+} f(x)$

e.  $f(4)$

f.  $\lim_{x \rightarrow \infty} f(x)$

g.  $\lim_{x \rightarrow -\infty} f(x)$



4. a.  $\frac{xy^{-1} - x^{-1}y}{xy^{-1} + 1}$

b.  $\frac{3x^{-4} + x^{-7}}{5x^{-9} - x^{-5}}$

5. Solve

a.  $\sqrt{x+5} = x-1$

b.  $x^3 - 441x = 0$

6. Multiply.

$$x^{\frac{1}{2}}(x^{\frac{5}{2}} - 7)(x^{\frac{1}{2}} + 7)$$

7. Simplify.

$$\frac{2x^2+3x-20}{x^2-16} \div \frac{2x^2-3x-5}{3x^2-27x+60}$$

8. Solve.

a.  $5^{6x-1} = 625$

b.  $7(3)^x = 56$

c.  $300\left(\frac{5}{2}\right)^{x-2} = 800$

9. The maximum weight  $M$  that can be supported by a beam is directly proportional to its width  $w$  and the square of its height  $h$ . It is inversely proportional to its length  $l$ .

a. Write the general equation of proportionality for the given situation.

b. Determine the constant of proportionality if a beam 4 inches wide, 6 inches high, and 12 feet long can support 7400 pounds.

c. If a beam is 10 feet long, 3 inches wide, and 10 inches high, what is the maximum weight it can support?

10. The electrical current produced by a wind-powered generator varies directly with the square of the wind velocity and inversely with the square root of the height of the generator. A generator that operates at a height of 2500 feet and produces 3000 watts when the wind is blowing 25 mph. How much energy will the generator produce if the wind is blowing at 20 mph?

11. Rewrite  $f(x) = \frac{2x+5}{x+2}$  as a transformation of  $g(x) = \frac{1}{x}$  and sketch the graph of  $f(x)$ .

12. Rewrite each of the following expressions as simple fractions without

negative exponents. a.  $\frac{x^2y^3 + x^{-2}}{y^{-3} + x}$

b.  $\frac{x^{-1} + x^2}{x^{-2} + x}$

13. Given  $f(x)$ , sketch  $1/f(x)$

14. Evaluate a limit given a table or a graph

15. Sketch a function given properties of limits

16. Simplify complex fractions and logs